

Application No. 10/828,508

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AMENDMENTS TO THE CLAIMS

1 – 21. (Canceled).

22. (Previously Presented) A spinal anchor assembly for securing a spinal fixation element, comprising:

an anchor element adapted for attachment to bone and defining a central longitudinal axis, the anchor element having an open slot for receiving the spinal fixation element, side walls on opposed sides of the open slot, and a plurality of anchor flange segments extending from the side walls in a direction generally transverse to the central longitudinal axis, the anchor flange segments each including an inferior contact surface extending in a direction with respect to the central longitudinal axis that defines a radial slant; and

a closure element for closing the open slot in the anchor element and applying pressure to the spinal fixation element to capture the spinal fixation element within the open slot, the closure element including a closure body and a plurality of closure flange segments extending from the closure body in a direction that is transverse to the anchor element central longitudinal axis when the closure element is placed in the open slot, each closure flange segment including a superior contact surface extending at an angle corresponding to the radial slant when the closure element is placed in the open slot so that the closure flange segment superior surfaces engage the anchor element flange segment inferior surfaces when the closure element is placed in a closed position in the anchor element open slot;

wherein the anchor element and closure element flanges are configured to permit the closure element to be placed into the open slot in the anchor element in an open position and to be twisted into the closed position, and the radial slant is configured so that, when the closure element is in its closed position and pressure is applied to secure the spinal fixation element within the open slot in the anchor element, the anchor element and closure element flanges are drawn together.

23. (Previously Presented) The assembly of claim 22, wherein the anchor element comprises a pedicle screw.

24. (Previously Presented) The assembly of claim 22, wherein the anchor element comprises a polyaxial pedicle screw.

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25. (Previously Presented) The assembly of claim 22, wherein the anchor element comprises a hook.

26. (Previously Presented) The assembly of claim 22, wherein at least one anchor flange segment is provided on each side wall.

27. (Previously Presented) The assembly of claim 22, wherein a plurality of anchor flange segments are provided on each side wall.

28. (Previously Presented) The assembly of claim 27, wherein the plurality of anchor flange segments provided on each side wall are configured so that the closure element can be moved from the open to the closed position by twisting the closure element by less than or equal to about twenty degrees.

29. (Previously Presented) The assembly of claim 22, wherein the closure element includes a central clamping element for applying pressure to a spinal fixation element.

30. (Previously Presented) The assembly of claim 29, wherein the central clamping element is separately tightenable with respect to the closure element.

31. (Previously Presented) The assembly of claim 30, wherein the assembly is configured so that the closure element can be placed in the closed position to movably capture a spinal fixation element within the open slot and the central clamping element can be separately tightened to fix the position of the spinal fixation element within the open slot.

32. (Previously Presented) The assembly of claim 29, wherein the central clamping element is rotatably connected to the closure element.

33. (Previously Presented) The assembly of claim 32, wherein the central clamping member is a central clamping bolt.

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34. (Previously Presented) The assembly of claim 22, wherein a locking element is provided on the closure element.

35. (Previously Presented) The assembly of claim 34, wherein the locking element is configured to lock upon rotation of the closure element from the open position to the closed position.

36. (Previously Presented) The assembly of claim 35, wherein, upon locking, the locking element deters the closure element from rotating back to the open position.

37. (Previously Presented) An anchor assembly for securing a fixation member to bone comprising:

an anchor element having a bone fixation member, a head with an opening for receipt of a fixation member, and a cap;

the head and the cap each containing a plurality of radially-protruding elements configured to allow the cap to be placed in the opening when the cap is oriented in a first, open position and to engage each other to hold the cap within the opening when the cap is rotated to a second closed position;

wherein the engagements between the head radially-protruding elements and the cap radially-protruding elements when the cap is placed in the closed position are angled along a radial direction so that the head radially-protruding elements and the cap radially-protruding elements bear against one another when a pressure is applied to the cap by the fixation member so as to draw the head radially-protruding elements and the cap radially-protruding elements together.

38. (Previously Presented) The assembly of claim 37, wherein the head comprises a plurality of side walls defining an open slot.

39. (Previously Presented) The assembly of claim 38, wherein the head radially-protruding elements are integral with the side walls of the head.

40. (Previously Presented) The assembly of claim 39, wherein the head further comprises

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angled inferior contact surfaces defined by the sidewalls and integral radially-protruding elements.

41. (Previously Presented) The assembly of claim 40, wherein the inferior contact surfaces are configured to hold the cap within the open slot when the cap is placed in the closed position.

42. (Previously Presented) The assembly of claim 38, wherein at least radially-protruding element is provided on each side wall.

43. (Previously Presented) The assembly of claim 38, wherein a plurality of radially-protruding elements are provided on each side wall.

44. (Currently Amended) The assembly of claim 43, wherein the plurality of radially-protruding elements ~~and~~ ~~flange segments~~ provided on each side wall are configured so that the cap closure element can be moved from the open to the closed position by twisting the closure element by less than or equal to about twenty degrees.

45. (Previously Presented) The assembly of claim 37, wherein the cap includes a central clamping element for applying pressure to a spinal fixation element.

46. (Previously Presented) The assembly of claim 45, wherein the central clamping element is separately tightenable with respect to the cap.

47. (Previously Presented) The assembly of claim 46, wherein the assembly is configured so that the cap can be placed in the closed position to movably capture a spinal fixation element within the head and the central clamping element can be separately tightened to fix the position of the spinal fixation element within the head.

48. (Previously Presented) The assembly of claim 45, wherein the central clamping element is rotatably connected to the cap.

49. (Previously Presented) The assembly of claim 48, wherein the central clamping member is

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a central clamping bolt.

50. (Previously Presented) The assembly of claim 37, wherein a locking element is provided on the cap.

51. (Previously Presented) The assembly of claim 50, wherein the locking element is configured to lock upon rotation of the cap from the open position to the closed position.

52. (Previously Presented) The assembly of claim 51, wherein, upon locking, the locking element deters the cap from rotating back to the open position.

53. (Previously Presented) The assembly of claim 37, wherein the bone fixation member comprises a pedicle screw.

54. (Previously Presented) The assembly of claim 37, wherein the bone fixation member comprises a polyaxial pedicle screw.

55. (Previously Presented) The assembly of claim 37, wherein the bone fixation member comprises a hook.

56. (Currently Amended) A spinal anchor assembly for securing a spinal fixation element, comprising:

an anchor element adapted for attachment to bone and defining a central longitudinal axis, the anchor element having an opening for receiving the spinal fixation element, side walls on opposed sides of the opening, and a plurality of inferior surfaces defined on the side walls; and

a closure element for closing the opening in the anchor element and applying pressure to the spinal fixation element to capture the spinal fixation element within the opening, the closure element including a closure body and a plurality of closure flange segments extending from the closure body in a direction that is generally transverse to the anchor element central longitudinal axis when the closure element is placed in the open slot; and

a locking element comprising a protrusion and groove provided on the cap and anchor

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element and configured so that when the closure element is placed into the opening in the anchor element in an open position and is twisted into a closed position in which the closure element flange segments engage the end anchor element inferior surfaces to hold the closure in the opening, the protrusion and groove engage so that the locking element deters the closure element from twisting back to the open position.

57. (Previously Presented) The assembly of claim 56, wherein the closure element includes a central clamping element for applying pressure to a spinal fixation element.

58. (Previously Presented) The assembly of claim 57, wherein the central clamping element is separately tightenable with respect to the closure element.

59. (Previously Presented) The assembly of claim 58, wherein the assembly is configured so that the closure element can be placed in the closed position to movably capture a spinal fixation element within the opening and the central clamping element can be separately tightened to fix the position of the spinal fixation element within the opening.

60. (Previously Presented) The assembly of claim 57, wherein the central clamping element is rotatably connected to the closure element.

61. (Previously Presented) The assembly of claim 60, wherein the central clamping member is a central clamping bolt.

62. (Previously Presented) The assembly of claim 56, wherein the inferior contact surfaces extend in a direction that defines a radial slant and the closure flange segments include a superior contact surface extending at an angle corresponding to the radial slant when the closure element is placed in the opening.

63. (Previously Presented) The assembly of claim 62, wherein the radial slant is configured so that when the closure flange segment superior surfaces engage the inferior surfaces when the closure element is placed in a closed position in the anchor element opening and pressure is

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applied to secure the spinal fixation element within the opening in the anchor element, the anchor element side walls and closure element flanges are drawn together.

64. (Previously Presented) The assembly of claim 56, wherein at least one inferior surface is provided on each side wall.

65. (Previously Presented) The assembly of claim 56, wherein a plurality of inferior surfaces are provided on each side wall.

66. (Previously Presented) The assembly of claim 65, wherein the plurality of inferior surfaces provided on each side wall are configured so that the closure element can be moved from the open to the closed position by twisting the closure element by less than or equal to about twenty degrees.

67. (Currently Amended) An anchor assembly for securing a fixation member to bone comprising:

an anchor element having a bone fixation member and a head, the head having an opening configured to receive a fixation member;

a locking cap having a plurality of flanges, the flanges configured so that the locking cap can be placed into the opening in the head when the locking cap is oriented in an open position and the fixation member is received within the opening in the head, and to engage inferior contact surfaces defined on the head to hold the locking cap within the head when the locking cap is rotated to a closed position and to thereby block the fixation member from exiting the head; and

a clamping element disposed on the locking cap, the clamping element being operable to clamp the fixation member to the head to prevent movement of the fixation member with respect to the head

wherein the head includes at least two side walls and a plurality of flange segments having inferior contact surfaces are provided on each side wall.

68. (Previously Presented) The assembly of claim 67, wherein the central clamping element is independently operable with respect to the cap.

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69. (Previously Presented) The assembly of claim 68, wherein the assembly is configured so that the cap can be placed in the closed position to movably capture a fixation element within the head and the central clamping element can be independently operated to fix the position of the fixation element within the head.

70. (Previously Presented) The assembly of claim 67, wherein the central clamping element is rotatably connected to the cap.

71. (Previously Presented) The assembly of claim 70, wherein the central clamping member is a central clamping bolt.

72. (Previously Presented) The assembly of claim 67, wherein a locking element is provided on the cap.

73. (Previously Presented) The assembly of claim 72, wherein the locking element is configured to lock upon rotation of the cap from the open position to the closed position.

74. (Previously Presented) The assembly of claim 73, wherein, upon locking, the locking element deters the cap from rotating back to the open position.

75. (Previously Presented) The assembly of claim 67, wherein the inferior contact surfaces are defined in at least one side wall of the head and extend in a direction that defines a radial slant and the cap flanges include a superior contact surface extending at an angle corresponding to the radial slant when the closure element is placed in the opening.

76. (Previously Presented) The assembly of claim 75, wherein the radial slant is configured so that when the cap flange superior surfaces engage the inferior surfaces when the closure element is placed in a closed position in the anchor element opening and pressure is applied to secure the fixation element within the opening in the anchor element, the anchor element side walls and cap flanges are drawn together.

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77. (Canceled)

78. (Canceled)

79. (Currently Amended) The assembly of ~~claim 67~~ ~~claim~~ 78, wherein the plurality of inferior surfaces provided on each side wall are configured so that the closure element can be moved from the open to the closed position by twisting the closure element by less than or equal to about twenty degrees.

80. (Currently Amended) An anchor assembly for securing a linkage, wherein the anchor assembly comprises:

an anchor element configured for attachment to a bone, and having a head having an open slot for receiving the linkage, the head including at least two side walls defining at least a portion of the open slot with inferior contact surfaces defined in the side walls; and

a cap for closing the open slot;

wherein the head and the cap are adapted to twist-lock together by a partial rotation to cover the slot so as to capture the linkage, and the cap further includes a central clamping member for tightening down to secure the linkage; and

wherein a plurality of flange segments having inferior contact surfaces are provided on each side wall.

81. (Previously Presented) The assembly of claim 80, wherein the central clamping element is independently operable with respect to the cap.

82. (Previously Presented) The assembly of claim 81, wherein the assembly is configured so that the cap can be placed in a closed position to movably capture a linkage within the head and the central clamping element can be independently operated to fix the position of the linkage within the head.

83. (Previously Presented) The assembly of claim 82, wherein the central clamping element is rotatably connected to the cap.

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84. (Previously Presented) The assembly of claim 83, wherein the central clamping member is a central clamping bolt.

85. (Previously Presented) The assembly of claim 80, wherein a locking element is provided on the cap.

86. (Previously Presented) The assembly of claim 85, wherein the locking element is configured to lock upon rotation of the cap from an open position to a closed position.

87. (Previously Presented) The assembly of claim 86, wherein, upon locking, the locking element deters the cap from rotating back to the open position.

88. (Currently Amended) The assembly of claim 80, wherein the head includes at least two side walls defining at least a portion of the open slot, inferior contact surfaces are defined in the side walls, and the cap includes flange segments that interact with the inferior surfaces in a closed position to close the open slot.

89. (Previously Presented) The assembly of claim 88, wherein the inferior contact surfaces extend in a direction that defines a radial slant and the cap flanges include a superior contact surface extending at an angle corresponding to the radial slant when the closure element is placed in the closed position.

90. (Previously Presented) The assembly of claim 89, wherein the radial slant is configured so that when the cap flange superior surfaces engage the inferior surfaces when the closure element is placed in the closed position in the anchor element open slot and pressure is applied to secure the linkage within the open slot in the anchor element, the anchor element side walls and cap flanges are drawn together.

91. (Canceled)

92. (Currently Amended) The assembly of claim 80 claim 81, wherein the plurality of inferior surfaces provided on each side wall are configured so that the closure element can be moved

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from the open to the closed position by twisting the closure element by less than or equal to about twenty degrees.